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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/816,360	03/26/2001	Masakazu Morishita	35.C15235	7337

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EXAMINER

LEE, SHUN K

ART UNIT PAPER NUMBER

2878

DATE MAILED: 11/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/816,360

Applicant(s)

MORISHITA, MASAKAZU

Examiner

Shun Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.                      6) ☐ Other:

## DETAILED ACTION

### *Drawings*

1. Figures 14A, 14B, and 15 should be designated by a legend such as --Prior Art-- because only that which is old (pg. 9, lines 12-19) is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 1008 (Fig. 13), 112 (Fig. 14A), 102a (Fig. 14), 102b (Fig. 14), 102c (Fig. 14), 136 (Fig. 14A), 160 (Fig. 15), and 231 (Fig. 15). A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
3. The drawings are objected to because in Fig. 2, "Vc" should probably be --Vc1-- (see pg 20, line 13). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Specification*

4. The substitute specification filed 6 February 2002 has not been entered because it does not conform to 37 CFR 1.125(b) because it lacks: (1) a statement that the substitute specification includes no new matter; and (2) a marked up version of the

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substitute specification showing all the changes (including the matter being added to and the matter being deleted from) to the specification of record.

5. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

6. The abstract of the disclosure is objected to because of the length. Correction is required. See MPEP § 608.01(b).

7. The disclosure is objected to because of the following informalities: "8" on line 11 of pg. 20 should probably be --11-- (see Fig. 2). Appropriate correction is required.

8. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Rejections - 35 USC § 112***

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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10. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

While applicant may be his or her own lexicographer, a term in a claim may not be given a meaning repugnant to the usual meaning of that term. See *In re Hill*, 161 F.2d 367, 73 USPQ 482 (CCPA 1947). The term "OFF voltage" (for thin film reset transistors) in independent claim 1 (and also in independent claim 9) is used by the claim to mean something other than a voltage that "... completely turns off the transistor ..." because "... the transistor 3 is held to an intermediary state between the completely ON state and the completely OFF state ..." (see lines 14-24 on pg. 21 of the specification), while the accepted meaning is a voltage such that "... the devices are in an off condition ..." (see for example, left column on pg. 151 of the Wiley encyclopedia of Electrical and Electronics Engineering Volume 22, J. G. Webster, Editor). It is further noted that the term "OFF voltage" (for thin film read transistors) in independent claim 1 is consistent with the usual meaning of that term (see lines 18-25 on pg. 22 of the specification which state that "... the read transistor 4 is completely turned off whereas the reset transistor 3 is not completely turned off ... "). It is suggest that "OFF voltage" (for thin film reset transistors) should probably be --intermediary state voltage--.

### ***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1-3, 5, 8-11, 13, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang (US 5,869,837) in view of Tsukamoto *et al.* (US 5,852,296) in so far as understood.

In regard to claims 1 and 9, Huang discloses (Fig. 2) an electromagnetic wave detector comprising:

- (a) conversion elements (4) for converting incident electromagnetic waves or radiations into an electric charge (column 3, lines 15-18);
- (b) storage capacitors (2) for storing (column 3, lines 15-18) the electric charge produced by the conversion elements (4);
- (c) thin film read transistors (*i.e.*, TFT readout switches 1; column 5, lines 31-35) connected respectively to the corresponding storage capacitors (2) and each having a gate to which ON and OFF voltages are applied respectively in readout and storage periods (column 3, lines 12-22); and
- (d) thin film reset transistors (*i.e.*, TFT reset switches 3) connected respectively to the corresponding storage capacitors (2) and each having a gate to which ON and OFF voltages are applied respectively in reset and storage periods (column 3, lines 40-53).

The electromagnetic wave detector of Huang lacks that the OFF voltage applied to the gates of the thin film reset transistors (3) being set to a value closer to the ON voltage applied to the gates of the thin film reset transistors (3) than the OFF voltage applied to the gates of the thin film read transistor (1) so that any excessive electric charge is

discharged by way of the thin film reset transistors (3) in each storage period.

Tsukamoto *et al.* teach (column 20, lines 55-67) a means to adjust the TFT gate voltage in order to sweep out the charges stored in the charge storage section when the voltage applied thereto exceeds a threshold value. Therefore it would have been obvious to one having ordinary skill in the art to adjust the TFT OFF gate voltage in the electromagnetic wave detector of Huang, in order to sweep out the charges stored in the charge storage section when the voltage applied thereto exceeds a threshold value as taught by Tsukamoto *et al.*

In regard to claim 2 (which is dependent on claim 1) and claim 10 (which is dependent on claim 9), Huang also discloses (column 3, lines 15-18) that the conversion elements (4) are adapted to absorb electromagnetic waves showing an energy level higher than visible light (*e.g.*, X-rays) and convert them into an electric charge.

In regard to claim 3 (which is dependent on claim 1) and claim 11 (which is dependent on claim 9), Huang also discloses that the thin film read transistors (1) and the thin film reset transistors (3) have a non-monocrystalline semiconductor layer (*e.g.*, a-Si; column 5; lines 43-57) formed on an insulating substrate (glass substrate 10; Figs. 5-9).

In regard to claim 5 (which is dependent on claim 1) and claim 13 (which is dependent on claim 9), Huang also discloses (Figs. 4-9) that the conversion elements comprises a semiconductor substrate (40) having two opposite surfaces for converting electromagnetic waves into an electric charge, a common electrode (42) arranged on

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the one surface of the semiconductor substrate (40) and a plurality of electrodes (22) formed on the other surface of the semiconductor substrate (40) and separated from each other in correspondence to a plurality of two-dimensional pixels (see Fig. 4); the thin film read transistors (1) and the thin film reset transistors (3) are formed on an insulating substrate (10) such that unit cells (1, 3) each including one of the thin film read transistors (1) and one of the thin film reset transistors (3) are arranged on the insulating substrate (10) in correspondence to the pixels (see Fig. 4); and the semiconductor substrate (40) and the insulating substrate (10) form a layered structure and the plurality of electrodes (22) and the unit cells (1, 3) are electrically connected between the substrates.

In regard to claim 8 (which is dependent on claim 1) and claim 16 (which is dependent on claim 9), Huang also discloses (Fig. 3; column 5; lines 43-57) that the thin film read transistors (1) and the thin film reset transistors (3) are formed on an insulating substrate (10) provided with a driver circuit (i.e., control circuits not illustrated but described on column 4, lines 12-17) for driving the thin film read transistors (1) and the thin film reset transistors (3) and with a read circuit (14) for reading signals from the thin film read transistors (1).

13. Claims 4, 6, 12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang (US 5,869,837) in view of Tsukamoto *et al.* (US 5,852,296) as applied to claims 1, 5, 9, and 13 above, and further in view of Jeuch *et al.* (US 5,391,881) in so far as understood.



In regard to claim 4 (which is dependent on claim 1) and claim 12 (which is dependent on claim 9), Huang also discloses (Figs. 2-9; column 5; lines 43-57) that the thin film read transistors (1) and the thin film reset transistors (3) are formed on an insulating substrate (10) and that the conversion elements (4) are electrically connected to the thin film read transistors (1) and the thin film reset transistors (3). The modified electromagnetic wave detector of Huang lacks that the conversion elements are formed on a substrate different from the insulating substrate. Jeuch *et al.* teach (column 2, line 14 to column 3, line 46) that conversion elements are formed on a substrate different from the insulating substrate allow the joining of a plurality of conversion element substrates and a plurality of insulating substrates so as to produce a large imaging device. Therefore it would have been obvious to one having ordinary skill in the art to provide conversion elements formed on a substrate different from the insulating substrate in the modified electromagnetic wave detector of Huang, in order to produce a large imaging device as taught by Jeuch *et al.*

In regard to claim 6 (which is dependent on claim 5) and claim 14 (which is dependent on claim 13), the modified electromagnetic wave detector of Huang lacks that the semiconductor substrate is provided in plurality as arranged two-dimensionally on the insulating substrate to form a layered structure and the common electrodes of the semiconductor substrates are mutually short-circuited. Jeuch *et al.* teach (column 2, line 14 to column 3, line 46) that conversion elements are formed on a substrate different from the insulating substrate allow the joining of a plurality of conversion element substrates and a plurality of insulating substrates so as to produce a large

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imaging device. Therefore it would have been obvious to one having ordinary skill in the art to join of a plurality of semiconductor substrates on an insulating substrate and mutually short-circuit the common electrodes of the semiconductor substrates in the modified electromagnetic wave detector of Huang, in order to produce a large imaging device as taught by Jeuch *et al.*

14. Claims 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang (US 5,869,837) in view of Tsukamoto *et al.* (US 5,852,296) as applied to claims 5 and 13 above, and further in view of Jeromin *et al.* (US 6,075,248) in so far as understood.

In regard to claim 7 (which is dependent on claim 5) and claim 15 (which is dependent on claim 13), Huang also discloses (column 5, lines 25-29) that a high voltage is applied to the common electrode (42) of the conversion elements (4). The modified electromagnetic wave detector of Huang lacks that a shielding conductor is arranged near the common electrode. Jeromin *et al.* teach (Fig. 3; column 4, line 64 to column 5, line 31) that a shielding conductor (56) is arranged near the common electrode (38) in order to prevent unacceptable noise lines. Therefore it would have been obvious to one having ordinary skill in the art to provide a shielding conductor in the modified electromagnetic wave detector of Huang, in order to prevent unacceptable noise lines as taught by Jeromin *et al.*

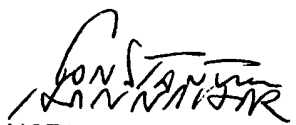
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**Conclusion**

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (703) 308-4860. The examiner can normally be reached on Tuesday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (703) 308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

  
CONSTANTINE HANNAHER  
PRIMARY EXAMINER  
GROUP ART UNIT 2878

SL  
October 31, 2002